

SINGLE SPRINKLER IN THE KITCHEN 25% FIRE FLOW CREDIT

Cooking is the leading cause of house fires in the United States. According to the NFPA, 40 percent of house fires and 36 percent of fire-related injuries are caused by cooking fires. Most cooking fires start when an oven or stove is left unattended. Many other cooking fires begin when items are left too close to cooking equipment and begin to burn.

A single sprinkler head in the kitchen has been selected as part of the fire flow credits for this building. The single sprinkler head does not provide the full protection of a residential sprinkler system but it does provide a level of protection.

Who Can Install a Single Kitchen Sprinkler Head

Only Certificate of Competency Holders licensed as a Fire Protection Sprinkler System Contractor are qualified to undertake the execution of contracts for the installation, inspection, maintenance, or servicing of a fire protection systems or any part of such a system.

An owner or occupier of a single-family residence performing his or her own installation in that residence is exempt from these certificate requirements. It is the intent of this exemption that builders or contractors will not install their own sprinkler systems in single-family residences under their ownership that they plan to sell, lease, or rent.

Sprinkler Piping

Piping serving the single sprinkler head in a kitchen shall be a part of the domestic water plumbing system. The pipe size shall be not less than 3/4-inch from the water source to the sprinkler head, except that a 5/8-inch utility meter may be installed in the water service. A valve is not allowed in the branch line to the sprinkler head and that line must continue on past the sprinkler head to one or more plumbing fixtures to assure no accumulation of stagnate water is present.

The Inspection – An inspection is required prior to calling for your energy inspection. Call 253-798-7179 to schedule the inspection

You will need two (2) of the sprinkler heads, one is a sacrificial head which will be used for the flow test and the other will be the head installed to satisfy the final inspection.

Water Pressure Test: One of the tests for a kitchen sprinkler head is a pressure test of the piping system. During the inspection the inspector is going to verify that the head is installed in a location that meets all of the criteria outlined in the Data Sheet.

They are going to verify that the sprinkler head is tied into the domestic plumbing of the house using not less than 3/4-inch water size pipe and that the piping continues past the sprinkler head another plumbing fixture. The kitchen sprinkler permit must be inspected and final approved prior to calling for an energy inspection.

Flow Testing: During the inspection the inspector is going to verify that water will flow through and out of the sacrificial sprinkler head with the correct pressure and spray pattern. You should consult with your fire sprinkler contractor or your licensed plumber for the proper testing manifold. If you are installing this sprinkler as the home owner you are exempt from the licensing requirements, but you are responsible for

providing the test manifold. With this test equipment installed it will allow the inspector to witness you opening the ball valve and flow water past the sacrificial head and into a container (large trash can) and record the pressure from the gauge. This verifies the water spray pattern and water pressure will be satisfactory (according to the Data Sheet) to extinguish a fire on the cooking surface of your range.

Picking the Right Sprinkler

Residential sprinkler systems are based on the quick response of the sprinkler. This quick response required the development of a separate standard specifically for residential sprinklers. The standard regulating residential sprinklers is UL 1626.

Data sheets are a part of the sprinkler listing. They are also part of the manufacturer's installation instructions. As such, the information on the manufacturer's Data Sheet is enforceable.

The Data Sheet is also packed in each box of residential sprinkler. The Data Sheet for the sprinkler being installed shall be provided to the inspector in the field as this is a tool for the inspector during the inspection.

Sprinkler Location

There are two main criteria for the location of sprinkler heads. First, sprinklers must be located so they are within the hot-gas layer that develops near the ceiling during a fire because activation occurs when the sprinkler head reaches a certain temperature. Second, they must be located so that the water that is discharged from the sprinkler is not disrupted or affected by construction elements such as beams, trusses, or soffits.

Sprinklers shall be installed in accordance with their listing where the type of ceiling configuration is referenced in the listing or data sheet for that individual sprinkler chosen. This data sheet shall be on the job site during your first inspection allowing the inspector to review compliance with the manufacture.

A pendent sprinkler is not permitted to be closer than 4 inches to the side wall. This is to prevent the wall from obstructing the spray pattern of the sprinkler.

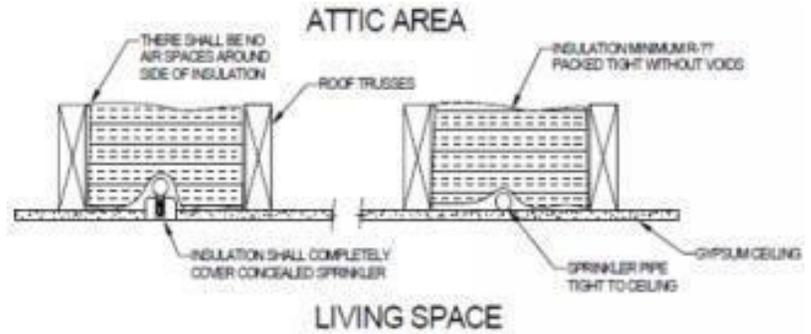
Cold Weather Protection

Sprinkler pipe must be protected from freezing, similar to plumbing cold water distribution piping. In colder climates, care must be exercised to prevent the sprinkler pipe from freezing.

The simple way of preventing sprinkler pipe from freezing is to not install the pipe in an outside wall or ceiling below an attic. Some contactors choose to use only sidewall sprinklers on the top floor to avoid installing sprinklers in the ceiling. It is not always possible to prevent sprinkler pipe from being installed in the ceiling below the attic.

Studies have shown that sprinkler pipe installed in a ceiling below an attic will not freeze if the pipe is located below the ceiling insulation. The insulation requirements in the ICC International Energy Code are adequate to prevent the pipe from freezing.

During the energy inspection the building inspector will check the placement of the insulation above the piping. There cannot be any voids or openings that allow cold air to enter and freeze the pipe. If the insulation is not installed prior to an inspection, the inspector must require the installation and return for another inspection. The inspector must be assured that the pipe will not freeze when placed in service.



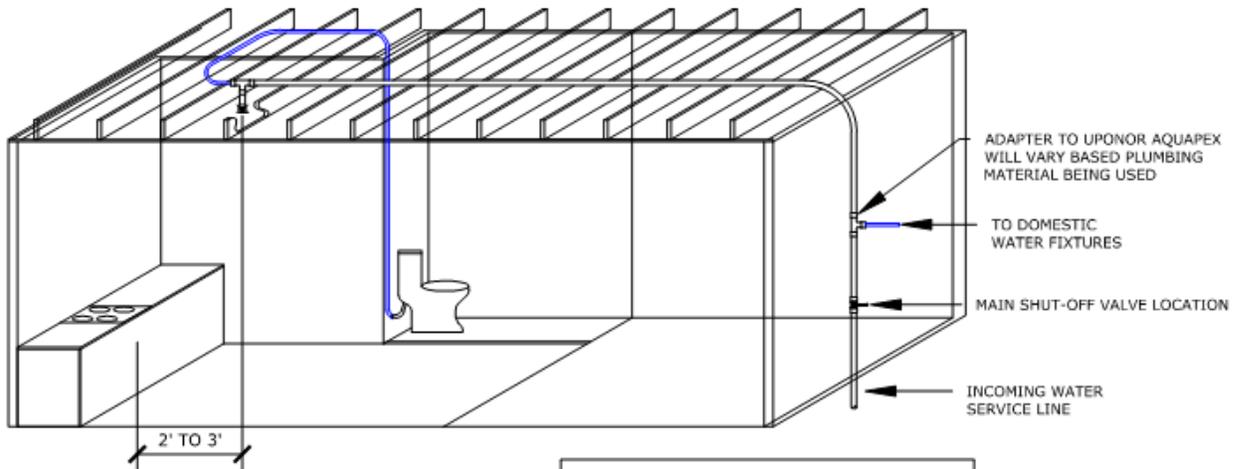
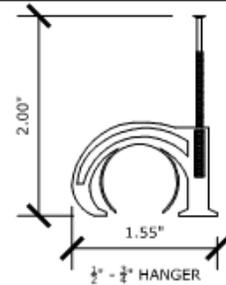
MULTIPURPOSE FIRE SPRINKLER INSTALLATION DETAIL FOR RESIDENTIAL SINGLE HEAD KITCHEN COVERAGE IN PIERCE COUNTY

SYSTEM REQUIREMENTS:

- MINIMUM STATIC PRESSURE: 50PSI
- MINIMUM METER SIZE: 3/4"
- PIPE RUN BETWEEN THE METER AND THE MAIN SHUT-OFF VALVE TO BE A MINIMUM OF 1" SIZE PIPE.
- MAXIMUM LENGTH OF PIPE BETWEEN THE METER AND THE MAIN SHUT-OFF VALVE NOT TO EXCEED 150'.
- IN THIS MULTI-PURPOSE SYSTEM A SINGLE SHUT-OFF VALVE CONTROLS BOTH DOMESTIC AND FIRE SAFETY NEEDS.
- PIPE RUN BETWEEN THE MAIN SHUT-OFF VALVE AND THE SPRINKLER HEAD TO BE A MINIMUM OF 3/4" SIZE PIPE.
- MAXIMUM LENGTH OF 3/4" PIPE RUN BETWEEN MAIN SHUT-OFF VALVE AND THE SPRINKLER NOT TO EXCEED 60'
- MAXIMUM NUMBER OF 90° FITTINGS IN THE 3/4" PIPE: 4
- SPRINKLER LINE TO TERMINATE AT THE NEAREST TOILET.
- MINIMUM 1/2" SIZE PIPE TO BE RUN BETWEEN THE SPRINKLER HEAD AND THE TOILET.
- PRESSURE REDUCING VALVE TO BE INSTALLED IF THE STATIC PRESSURE IS ABOVE 80 PSI.
- IF SYSTEM REQUIREMENTS CANNOT BE MET, CONTACT A-PEX DESIGN SERVICES AT 425-493-9680 FOR ALTERNATE DESIGN

TUBING SUPPORT SPACING:

- (ANCHOR AQUAPEX TUBING SECURELY ENOUGH TO SUPPORT THE TUBING, YET RELAXED ENOUGH TO ALLOW THE TUBING TO EXPAND AND CONTRACT)
- ALONG HORIZONTAL RUNS, INSTALL SUPPORTS EVERY 32", IF HORIZONTAL RUNS ARE CONTINUOUSLY SUPPORTED, PLACE TUBING SUPPORTS AT SIX-FOOT INTERVALS.
 - ALONG VERTICAL RUNS, INSTALL SUPPORTS EVERY FOUR TO FIVE FEET, AT EACH FLOOR AND AT A MID-STORY GUIDE.



SPRINKLER HEAD TO BE LOCATED A MINIMUM OF 2' AND A MAXIMUM OF 3' FROM THE RANGE (MEASURED FROM THE FRONT OF THE RANGE TO THE CENTER OF THE SPRINKLER HEAD).

ADD 2 3/4" PEX RINGS FOR EVERY ADDITIONAL 3/4" EP ELBOW

LIST OF MATERIALS		
PART NUMBER	DESCRIPTION	RECOMENDED QUANTITY
F1040750	3/4" UPONOR AQUAPEX (100' COIL) - WHITE PEX	1
F3040500	1/2" UPONOR AQUAPEX (100' COIL) - BLUE PEX	1
Q4690756	3/4" PEX RINGS	8
Q4690512	1/2" PEX RINGS	2
Q4760750	3/4" EP ELBOW	2
Q4757557	3/4" X 1/2" X 3/4" EP TEE	1
RS-RFC30LL-A	CONCEALED SPRINKLER HEAD ASSEMBLY	1
RS-CRFCW	CONCEALED COVER PLATE	1

20' STRAIGHT LENGTHS OF PEX ARE ALSO AVAILABLE, BUT WILL REQUIRE ADDITIONAL COUPLINGS. CONSULT YOUR LOCAL UPONOR PLUMBING DISTRIBUTOR FOR ADDITIONAL INFORMATION.

MILWAKEE PROPEX M-12 EXPANDER TOOL WILL BE REQUIRED FOR INSTALLATION.

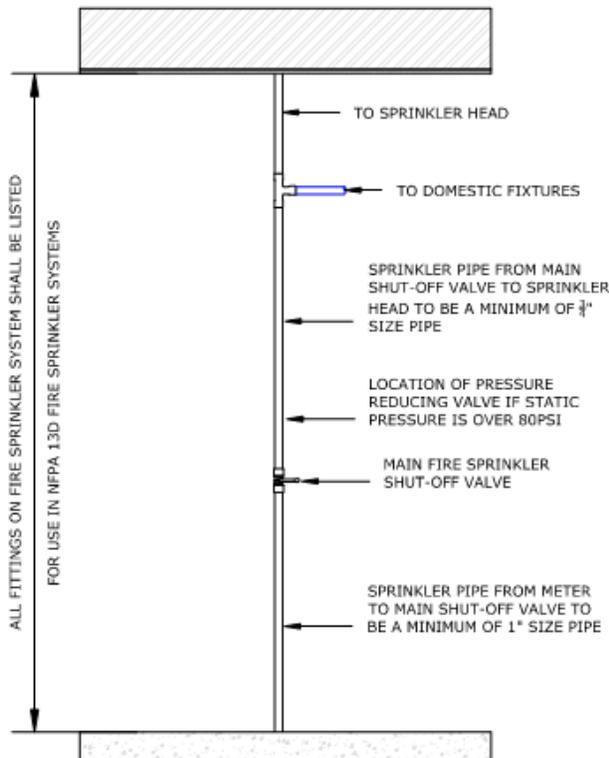


PHONE: 425-493-9680
EMAIL: SALES@APEXDESIGNSERVICES.COM

MULTIPURPOSE FIRE SPRINKLER INSTALLATION DETAIL FOR RESIDENTIAL SINGLE HEAD KITCHEN COVERAGE IN PIERCE COUNTY

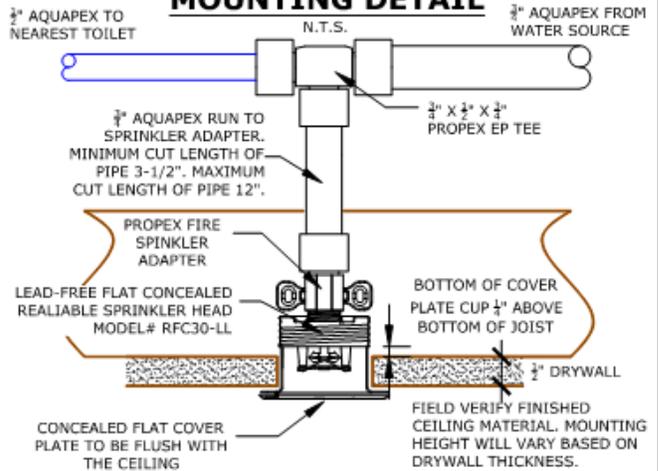
STANDARD RISER ASSEMBLY

IN A MULTI-PURPOSE SYSTEM A SINGLE CONTROL VALVE CONTROLS BOTH DOMESTIC AND FIRE SAFETY NEEDS.



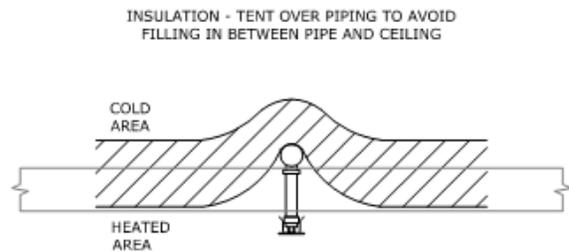
ALL FITTINGS ON FIRE SPRINKLER SYSTEM SHALL BE LISTED FOR USE IN NFPA 13D FIRE SPRINKLER SYSTEMS

CONCEALED ADAPTER FITTING MOUNTING DETAIL



TENT INSULATION DETAIL

N.T.S.



NFPA 13D TABLE 7.5.5.3 DISTANCES FROM HEAT SOURCES

Heat Source	Ordinary Temp. 135°-170°
50W-250W Light Fixture	6"
250W-499W Light Fixture	12"



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INSPECTION REQUIREMENTS

- The person who did the install shall have a current Certificate of Competency (minimum of: Level 1) as issued by the Office of the Washington State Fire Marshal. For questions or special circumstances, please contact our office at 253-798-7179
- You will need to have the cut sheets ready on site for the inspection (these are the manufacturer's specifications on the sprinkler head)
- There will need to be a bucket test/flow test done during the inspection, so you will need to have the test gear ready on site. For more information, please see instructions below

CONDUCTING A FIRE SPRINKLER FUNCTIONAL FLOW TEST (BUCKET TEST)

Flow test setup

The four following requirements are necessary for a proper flow test.

1. Pressure gauge installed immediately downstream from the system's main shutoff valve
2. Marked bucket capable of holding 30 gallons of water
3. Long piece of 2" or larger rigid pipe
4. Flow test assembly (**Figure 1**)

The pressure gauge records the residual pressure during the flow test. To measure accurately, the gauge must have a maximum pressure reading that is slightly higher than the normal static pressure.

For example, if the static pressure is 65psi, install an 80psi gauge. Note that a gauge that reads too high will not measure the lower residual pressures adequately.

The pressure gauge is also critical should troubleshooting be necessary.



Figure 1: Flow test assembly

Flow test assembly

The flow test assembly consists of the following parts (**Figure 1**).

- Short, ½" galvanized, threaded nipple (4" maximum)
- Two ½" x 1" galvanized, threaded bushings
- 1" full-port ball valve
- Appropriate sprinkler orifice

You can add an optional gauge trim consisting of an additional short, galvanized threaded nipple, a ½" galvanized threaded tee, a ½" x ¼" galvanized threaded bushing and a 30psi or 60psi pressure gauge.

The flow test bucket can be anything that can hold 30 gallons of water (**Figure 2**). This bucket will need to be marked before performing the flow test. To mark the bucket, fill the bucket in one-gallon increments and mark each water level with a waterproof marker until you reach the 30-gallon level. Make sure all measurements are as accurate as possible since slight variations could dramatically affect the final waterline. This bucket can be used for multiple flow tests.

The rigid pipe can be cut-to-length on the jobsite. It is used to direct the flow of water into the bucket.

Performing the test

1. Locate the most hydraulically demanding sprinkler. The demanding sprinkler is shown on the fire protection drawing in the 'Hydraulically Most Remote Heads' detail.
2. With the system turned off and drained, remove the sprinkler from the sprinkler adapter fitting.
3. Insert the flow test assembly.
4. Attach the test orifice to the end of the test assembly. The test orifice must match the size of the hydraulically demanding sprinkler. Dismantling a spare sprinkler is the best way of insuring you have the proper orifice size.
5. Charge and fill the system.
6. Open the ball valve on the test assembly and flow water until air is completely out of the system. Trapped air will negatively affect the flow test.
7. Once air is purged, close the ball valve on the test assembly and prepare the test bucket.
8. Open the apparatus and perform a timed flow for one minute.
9. If the amount of water in the bucket matches or exceeds the calculated flow on the plan, the flow test is a success.
10. If the water in the bucket does not equal the calculated flow on the plan, review the troubleshooting checklist and perform the flow test again.

Troubleshooting

All flow test failures fit into one of the following three categories.

1. Problem in the system supply
2. Problem in the system piping
3. Problem in the flow test procedure or equipment

In the event of a flow test failure, make sure all valves (angle-stop valve, curb stop, main shutoff valve, flow test kit valve, etc.) are completely open and free from obstruction.

Perform the flow test again and get an accurate residual (flowing) pressure from the gauge you installed. Since each system has been hydraulically calculated to perform at a certain pressure at the main shutoff valve, the pressure reading will help determine whether the problem is upstream in the supply pipe or downstream in either the system or flow test assembly.

Potential system supply problems

- Underground pipe sizes do not match those shown on the plan
- Pipe distances do not match those shown on the plan
- Meter size is different (verify both inlet and outlet side of the meter)
- Additional fittings have been installed
- Extra valves have been installed
- PRV (if present) is not completely open
- PRV (if present) does not match size, make or model shown on the plan
- Elevations do not match those shown on the plans
- Supply pump/booster pump does not match the plan requirements

Potential system piping problems

- Trapped air
- Kinked or flattened tubing
- Missing cross connections or other missing tubing
- PRV (if present) is not completely open
- PRV (if present) does not match size, make or model shown on the plan
- Tubing sizes do not match those shown on the plan
- Tee orientations do not match those shown on the plan

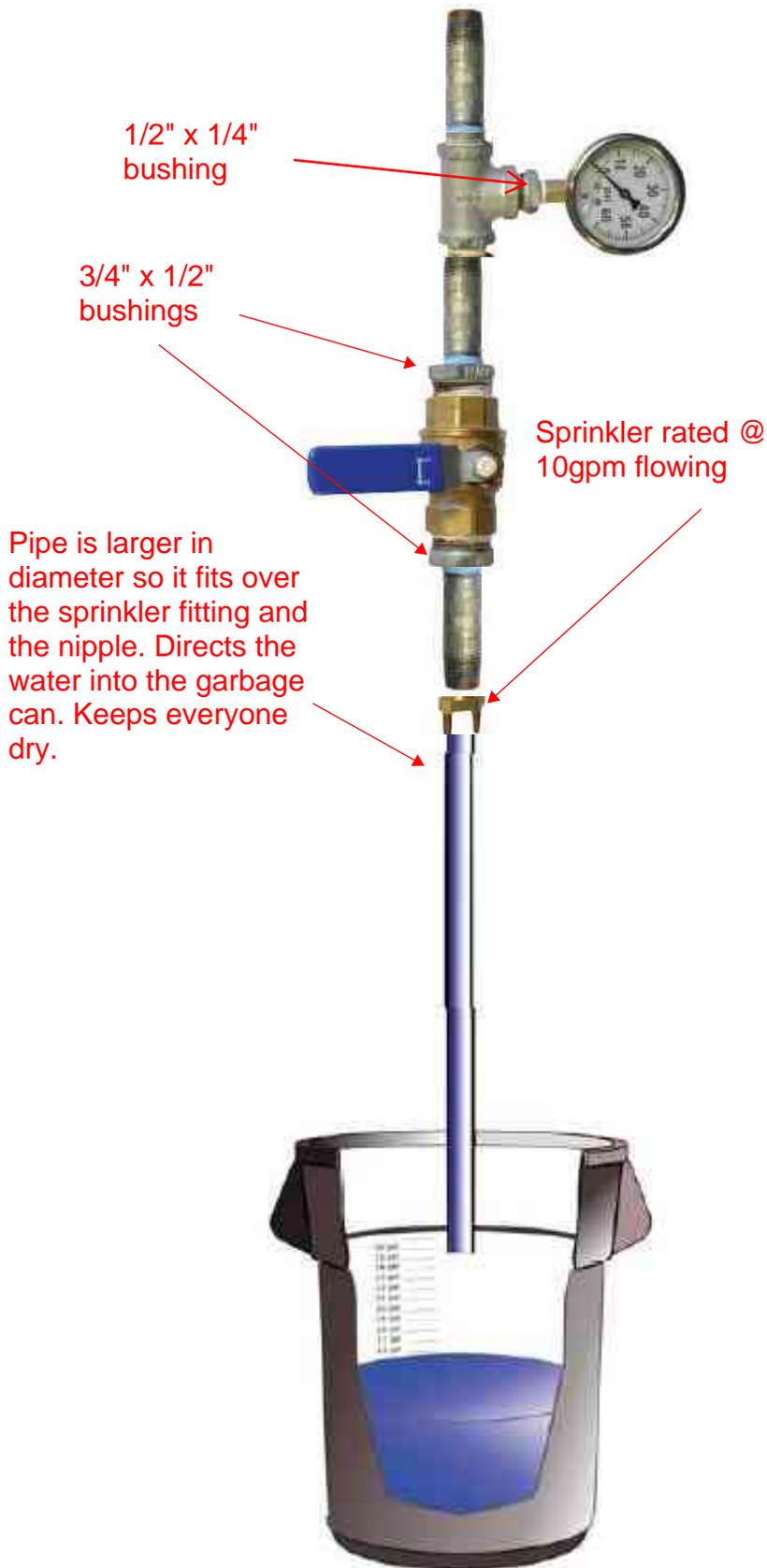
Potential flow test procedure or equipment problems

- Test was not performed for the full 60 seconds
- Test bucket is improperly marked
- The incorrect test orifice was used
- The water was directed through a flexible line into the bucket instead of a rigid pipe resulting in high friction loss
- The nipples on the test assembly are too long, resulting in high friction loss
- The test valve is defective
- The test valve is not full port
- Teflon[®] tape is causing an obstruction

Pierce Co. Fire Marshal's Office

Fire Sprinkler Bucket Test

Assembly & Test Instructions



MATERIAL

1. 1/2" Pipe nipples
2. 1) 1/2" x 1/2" x 1/2" T
3. 1/2" x 1/4" Bushings (gauge connect)
4. 2)-3/4" x 1/2" Bushings
5. 3/4" x 3/4" Quarter turn ball valve
6. Sprinkler head with hardware removed
7. 20 gallon container (garbage can)
7. 5 gallon bucket

TEST

After all hooked up, run the water into the garbage can until all the air is out of the system. Then empty the container

Take a static psi reading

Have someone there to help time if necessary

Open the valve start the timer and run for 30 seconds. Shut down

Determine the amount of water in the garbage can by pouring into a 5gallon bucket.

Multiply the measured amount x2 to give you a GPM flow. Match that with the sprinkler cut sheet.

Example: You fill the 5 gallon bucket (5gal), dump that and put the remaining water from the garbage can into the bucket and determine approx gallons.

If it's half full (we'll call it 2.5 gallons) for a total of 7.5 gallons from the garbage can.

If it fills the bucket twice, it's 10 gallons and so on -Keep track.

7.5 gallons (water measured from the garbage can) x 2 = 15 gpm

Sprinkler cut sheet flow rating is 10gpm
You flowed 15gpm

YOU PASSED!!!